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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/051,574	01/18/2002	Bruce Ferguson	5650-02000	5836

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EXAMINER	
HOLMES, MICHAEL B	
ART UNIT	PAPER NUMBER
2121	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/051,574	FERGUSON ET AL.
	Examiner	Art Unit
	Michael B. Holmes	2121

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE (3) MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 18 January 2002.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-90 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-90 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 18 January 2002 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 6192003/7112003.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☒ Other: Detailed Office Action.

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Examiner's Detailed Office Action

1. This Office Action is responsive to application 10/051,574, filed January 18, 2002.

2. Claims 1-90 have been examined.

Claim Objection(s)

3. Claims 68-90 are objected to because applicant employs the language of a "carrier medium" which is not supported in the written description of the specification. However, it appears as if the intended usage is "memory medium" which is supported in the written description of the specification, and if substituted will satisfy the requirement. Appropriate correction is required.

Double Patenting

4. Claims 1-90 of the present Application No. 10/051,574 is provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-90 of copending Application No. 10/051,421. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-90 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Keeler et al.* (USPN 5,729,661) in view of *Michael J. Tipping* (hereinafter "*Tipping*") "Sparse Bayesian Learning and the Relevance Vector Machine, June 2001.

Regarding claim 1. *Keeler et al.* describes a data preprocessor [*see* ABSTRACT], an input buffer for receiving and storing the input data, the input data associated with at least two of the inputs being on different time scales relative to each other [*see* C 2, L 46-50 & C 3, L 7-11 *Examiner interprets the input data comprising a set of target output data representing the output of the system and the set of measured input data representing the system variables. The target data and system variables are reconciled by the preprocessor and then input to the network e.g., system variables such as temperature, flow rates, etc.,*]; a time merge device for selecting a predetermined time scale and reconciling the input data stored in the input buffer such that all of the input data for all of the inputs are on the same time scale [*see* C 2, L 50-53]; and an output device for outputting the data reconciled by the time merge device as reconciled data [*see* C 2, L 53-56].

However, *Keeler et al.* does not describe a support vector machine having multiple inputs. *Tipping* describes a support vector machine having multiple inputs [*see* 4.3 Extensions, page

223, second paragraph]. It would have been obvious at the time the invention was made to a persons having ordinary skill in the art to combine *Keeler et al.* with *Tipping* because the key feature of the Support Vector Machine (SVM) is that, in the classification case, its target function attempts to minimize a measure of error on the training set while simultaneously maximizing the 'margin' between the two classes (in the feature space implicitly defined by the kernel), *see* middle of page 212.

Regarding claim 24. *Keeler et al.* describes a data preprocessor [*see* ABSTRACT], an input buffer for receiving and storing the input data [*see* C 2, L 46-50], the input data associated with at least two of the inputs being on different independent variable (*Examiner interprets the independent variable as the predictor variables*) scales relative to each other [*see* C 2, L 46-50 & C 3, L 7-11 *Examiner interprets the input data comprising a set of target output data representing the output of the system and the set of measured input data representing the system variables. The target data and system variables are reconciled by the preprocessor and then input to the network e.g., system variables such as temperature, flow rates, etc.,*]; a merge device for selecting a predetermined independent variable scale and reconciling the input data stored in the input buffer such that all of the input data for all of the inputs are on the same independent variable scale [*see* C 2, L 50-53 *Examiner interprets a time merge device operable with the set of merge devices*]; and an output device for outputting the data reconciled by the merge device as reconciled data [*see* C 2, L 53-56].

However, *Keeler et al.* does not describe a support vector machine having multiple inputs. *Tipping* describes a support vector machine having multiple inputs [*see* 4.3 Extensions, page

223, second paragraph]. It would have been obvious at the time the invention was made to a persons having ordinary skill in the art to combine *Keeler et al.* with *Tipping* because the key feature of the Support Vector Machine (SVM) is that, in the classification case, its target function attempts to minimize a measure of error on the training set while simultaneously maximizing the 'margin' between the two classes (in the feature space implicitly defined by the kernel), page 212, middle of page.

Regarding claim 31. *Keeler et al.* describes a method for preprocessing input data, each of the inputs associated with a portion of the input data [*see* ABSTRACT], the method comprising: receiving and storing the input data, the input data associated with at least two of the inputs being on different time scales relative to each other [*see* C 2, L 46-50 & C 3, L 7-11 *Examiner interprets the input data comprising a set of target output data representing the output of the system and the set of measured input data representing the system variables. The target data and system variables are reconciled by the preprocessor and then input to the network e.g., system variables such as temperature, flow rates, etc.,*]; time merging the input data for the inputs such that all of the input data are reconciled to the same time scale [*see* C 2, L 50-53]; and outputting the reconciled time merged data as reconciled data [C 2, L 53-56].

However, *Keeler et al.* does not describe a support vector machine having multiple inputs. *Tipping* describes a support vector machine having multiple inputs [*see* 4.3 Extensions, page 223, second paragraph]. It would have been obvious at the time the invention was made to a persons having ordinary skill in the art to combine *Keeler et al.* with *Tipping* because the key feature of the Support Vector Machine (SVM) is that, in the classification case, its target

function attempts to minimize a measure of error on the training set while simultaneously maximizing the 'margin' between the two classes (in the feature space implicitly defined by the kernel), page 212, middle of page.

Regarding claim 54. *Keeler et al.* describes a method for preprocessing [*see* ABSTRACT] input data, receiving and storing the input data, the input data associated with at least two of the inputs being on different independent variable (*Examiner interprets the independent variable as the predictor variables*) scales relative to each other [*see* C 2, L 46-50 & C 3, L 7-11 *Examiner interprets the input data comprising a set of target output data representing the output of the system and the set of measured input data representing the system variables. The target data and system variables are reconciled by the preprocessor and then input to the network e.g., system variables such as temperature, flow rates, etc.,*]; reconciling the input data stored in the input buffer such that all of the input data for all of the inputs are on the same independent variable (*Examiner interprets the independent variable as the predictor variables*)scale to generate reconciled data; and outputting reconciled data [C 2, L 53-56].

However, *Keeler et al.* does not describe a support vector machine having multiple inputs. *Tipping* describes a support vector machine having multiple inputs [*see* 4.3 Extensions, page 223, second paragraph]. It would have been obvious at the time the invention was made to a persons having ordinary skill in the art to combine *Keeler et al.* with *Tipping* because the key feature of the Support Vector Machine (SVM) is that, in the classification case, its target function attempts to minimize a measure of error on the training set while simultaneously maximizing the 'margin' between the two classes (in the feature space implicitly defined by the kernel), page 212, middle of page.

Regarding claim 61. *Keeler et al.* describes a system for preprocessing [*see* ABSTRACT] input data, means for receiving and storing the input data, the input data associated with at least two of the inputs being on different independent variable scales relative to each other [*see* C 2, L 46-50 & C 3, L 7-11 *Examiner interprets the input data comprising a set of target output data re-presenting the output of the system and the set of measured input data representing the system variables. The target data and system variables are reconciled by the preprocessor and then input to the network e.g., system variables such as temperature, flow rates, etc.,*]; means for reconciling the input data stored in the input buffer such that all of the input data for all of the inputs are on the same independent variable (*Examiner interprets the independent variable as the predictor variables*) scale to generate reconciled data [*see* C 2, L 50-53]; and means for outputting reconciled data [C 2, L 53-56].

However, *Keeler et al.* does not describe a support vector machine having multiple inputs. *Tipping* describes a support vector machine having multiple inputs [*see* 4.3 Extensions, page 223, second paragraph]. It would have been obvious at the time the invention was made to a persons having ordinary skill in the art to combine *Keeler et al.* with *Tipping* because the key feature of the Support Vector Machine (SVM) is that, in the classification case, its target function attempts to minimize a measure of error on the training set while simultaneously maximizing the 'margin' between the two classes (in the feature space implicitly defined by the kernel), page 212, middle of page.

Regarding claim 68. *Keeler et al.* describes a carrier medium which stores program instructions [*Examiner interprets an program instructions as an* algorithm] for preprocessing input [*see* FIG. 1, item 14, C 4, L 48-59] each of the inputs associated with a portion of the input data, wherein said program instructions are executable to: receive and store the input data, wherein the input data associated with at least two of the inputs are on different time scales relative to each other [*see* C 2, L 46-50 & C 3, L 7-11 *Examiner interprets the input data comprising a set of target output data representing the output of the system and the set of measured input data representing the system variables. The target data and system variables are reconciled by the preprocessor and then input to the network e.g., system variables such as temperature, flow rates, etc.,*]; time merge the input data for the inputs such that all of the input data are reconciled to the same time scale [C 2, L 50-53]; and output the reconciled time merged data as reconciled data [C 2, L 53-56].

However, *Keeler et al.* does not describe a support vector machine having multiple inputs. *Tipping* describes a support vector machine having multiple inputs [*see* 4.3 Extensions, page 223, second paragraph]. It would have been obvious at the time the invention was made to a persons having ordinary skill in the art to combine *Keeler et al.* with *Tipping* because the key feature of the Support Vector Machine (SVM) is that, in the classification case, its target function attempts to minimize a measure of error on the training set while simultaneously maximizing the 'margin' between the two classes (in the feature space implicitly defined by the kernel), page212, middle of page.

Regarding claims 2, 25, 32, 55, 62 & 69. the support vector machine [*see Tipping,* 1. Introduction, page 211-213] comprises a non-linear model having a set of model parameters defining a representation of a system, said model parameters capable of being trained [*see Keeler et al.,* Abstract]; wherein the input data comprise training data including target input data and target output data, wherein said reconciled data comprise reconciled training data including reconciled target input data and reconciled target output data, and wherein said reconciled target input data and reconciled target output data are both based on a common time scale [*see Keeler et al.,* C 2, L 46 to C 3, L 26 & C 4, L 40-47] and a common independent variable scale [*see Keeler et al.,* C 3, L 1-16 *Examiner interprets the set of training data as the common independent variable scale*]; and wherein the support vector machine [*see Tipping,* 1. Introduction, page 211-213] is operable to be trained according to a predetermined training algorithm applied to said reconciled target input data and said reconciled target output data to develop model parameter values such that said support vector machine [*see Keeler et al.* C 21, L 3-17, & Abstract; *see also Tipping,* 1. Introduction, page 211-213] has stored therein a representation of the system that generated the target output data in response to the target input data [*see Keeler et al.,* C 2, L 46 to C 3, L 26].

Regarding claims 3, 26, 33, 56, 63 & 70. the support vector machine [*see Tipping,* 1. Introduction, page 211-213] comprises a non-linear model having a set of model parameters defining a representation of a system [*see Keeler et al.,* C 3, L 1-26], wherein said model parameters of said support vector machine have been trained to represent said system; wherein the input data comprise run-time data, and wherein said reconciled data comprise reconciled run-time data [*see Keeler et al.,* C 3, L 1-26]; and wherein the support vector machine [*see Tipping,* 1. Introduction,

page 211-213] is operable to receive said reconciled run-time data and generate run-time output data, wherein said run-time output data comprise one or both of control parameters for said system and predictive output information for said system [*see Keeler et al.,* C 3, L 1-26].

Regarding claims 4, 34 & 71. said control parameters are usable to determine control inputs to said system for run-time operation of said system [*see Keeler et al.,* C 5, L 11-30].

Regarding claims 5, 27, 35, 57, 64 & 72. the input data associated with at least one of the inputs has missing data in an associated time sequence, an associated independent variable sequence, and said time merge device is operable to reconcile said input data to fill in said missing data [*see Keeler et al.,* Abstract, C 1, L 26-48 & C 4, L 1-59].

Regarding claims 6, 28, 36, 58, 65 & 73. the input data associated with a first one or more of the inputs has an associated time sequence based on a first time interval, and a second one or more of the inputs has an associated time sequence based on a second time interval [*see Keeler et al.,* C 7, L 10-32]; and wherein said time merge device is operable to reconcile said input data associated with said first one or more of the inputs to said input data associated with said second one or more of the inputs, thereby generating reconciled input data associated with said at least one of the inputs having an associated time sequence based on said second time interval [*see Keeler et al.,* C 7, L 10-32].

Regarding claims 7, 29, 37, 59, 66 & 74. the input data associated with a first one or more of the inputs has an associated time sequence based on a first time interval, and wherein the input data associated with a second one or more of the inputs has an associated time sequence based on a second time interval; and wherein said time merge device is operable to reconcile said input data associated with said first one or more of the inputs and said input data associated with said second one or more of the inputs to a time scale based on a third time interval, thereby generating reconciled input data associated with said first one or more of the inputs and said second one or more of the inputs having an associated time sequence based on said third time interval [*see Keeler et al.,* FIG. 5b, C 8, L 10-36].

Regarding claims 8, 30, 38, 60, 67 & 75. the input data associated with a first one or more of the inputs is asynchronous, and wherein the input data associated with a second one or more of the inputs is synchronous with an associated time sequence based on a time interval [*see Keeler et al.,* C 1, L 18-23, C 2, L 11-15 & Fig. 5*b*, C 8, L 10-53]; and wherein said time merge device is operable to reconcile said asynchronous input data associated with said first one or more of the inputs to said synchronous input data associated with said second one or more of the inputs, thereby generating reconciled input data associated with said first one or more of the inputs, wherein said reconciled input data comprise synchronous input data having an associated time sequence based on said time interval [*see Keeler et al.,* C 1, L 18-23, C 2, L 11-15 & Fig. 5*b*, C 8, L 10-53].

Regarding claims 9-16, 39-46 & 76-83. the input buffer is controllable to arrange the input data in a predetermined format [*see Keeler et al.* C 2, L 46-67 & FIG. 1, C 4, L 21-65].

Regarding claims 17, 47 & 84. the input data comprise a plurality of variables, each of the variables comprising an input variable with an associated set of data wherein each of said variables comprises an input to said input buffer [*see Keeler et al.,* C 3, L 17-26 & C 4, L 21-39]; and wherein each of at least a subset of said variables comprises a corresponding one of the inputs to the support vector machine [*see Tipping,* 1. Introduction, page 211-213].

Regarding claims 18, 48 & 85. a delay device for receiving reconciled data associated with a select one of said input variables and introducing a predetermined mount of delay to said reconciled data to output a delayed input variable and associated set of delayed input reconciled data [*see Keeler et al.,* FIG. 1, item 16, C 3, L 17-26].

Regarding claims 19, 49 & 86. a predetermined amount of delay is a function of an external variable, the data preprocessor further comprising: means for varying said predetermined amount of delay as a function of said external variable [*see Keeler et al.,* FIG. 1, item 16, C 3, L 17-26].

Regarding claims 20, 50 & 87. means for learning said predetermined delay as a function of training parameters generated by a system modeled by the support vector machine [*see Keeler et al.* C 5, L 31-39 & *Tipping,* 1. Introduction, page 211-213].

Regarding claims 21-23, 51-53 & 88-90. a graphical user interface (GUI) which is operable to receive user input specifying one or more data manipulation and/or reconciliation operations to be performed on said input data [*see Keeler et al.* FIG. 2, item 62, C 5, L 37-46; FIG. 6, item 76 & FIG 7a-7f, C 8, L 54 to C 9, L 9 & C 10, L 32-48].

Correspondence Information

7. Any inquires concerning this communication or earlier communications from the examiner should be directed to Michael B. Holmes, who may be reached Monday through Friday, between 8:00 a.m. and 5:00 p.m. EST. or via telephone at (571) 272-3686 or facsimile transmission (571) 273-3686 or email Michael.holmesb@uspto.gov.

If you need to send an Official facsimile transmission, please send it to (703) 746-7239.

If attempts to reach the examiner are unsuccessful the Examiner's Supervisor, Anthony Knight, may be reached at (571) 272-3687.

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Thursday, April 07, 2005

MBH